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FE-I4 Probing at Glasgow

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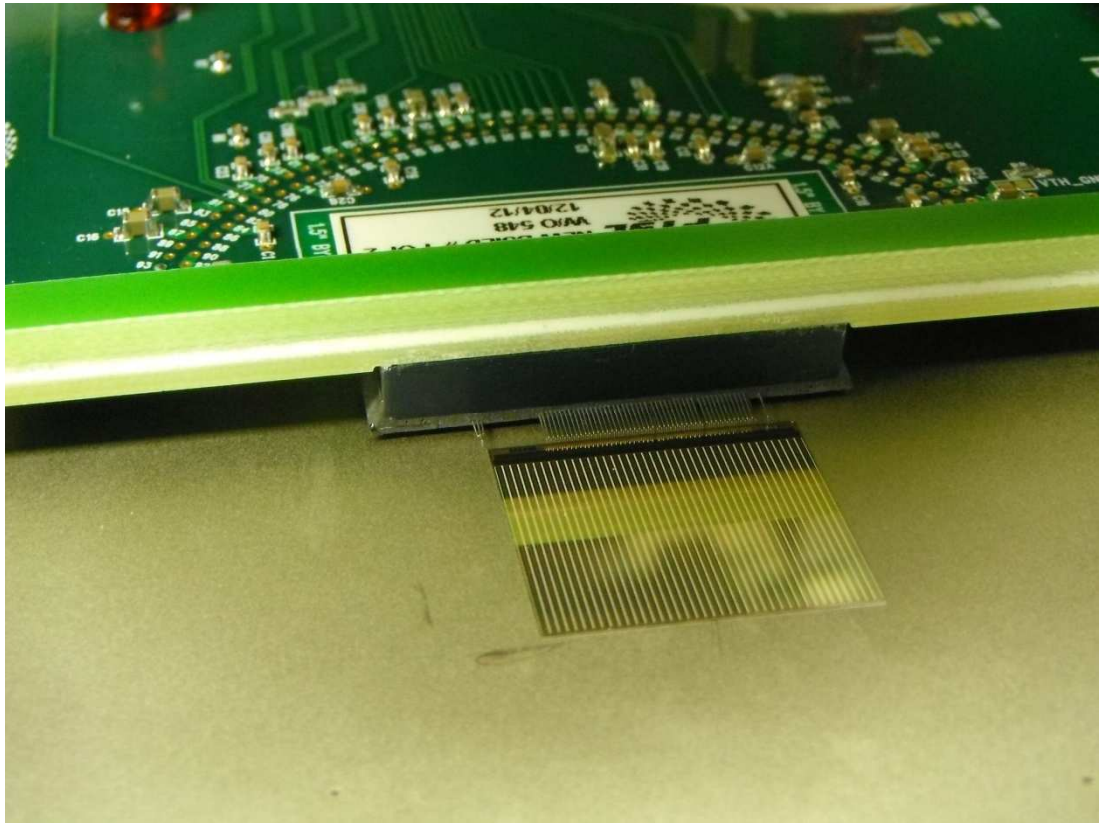
16th May 2012



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- **Wafer Probing Setup**
  - Cascade S300 Probe Station & Probe Card
  - USBpix & Laptop with STcontrol
  - TTi dual power supply for USBpix
  - Keithley 2700 & Scanner Card for Voltage Measurements
  - Keithley 2410 for I_{REF} Measurement
  - Second Keithley 2410 on order
  - TTi PSU for I_{CAP} measurement

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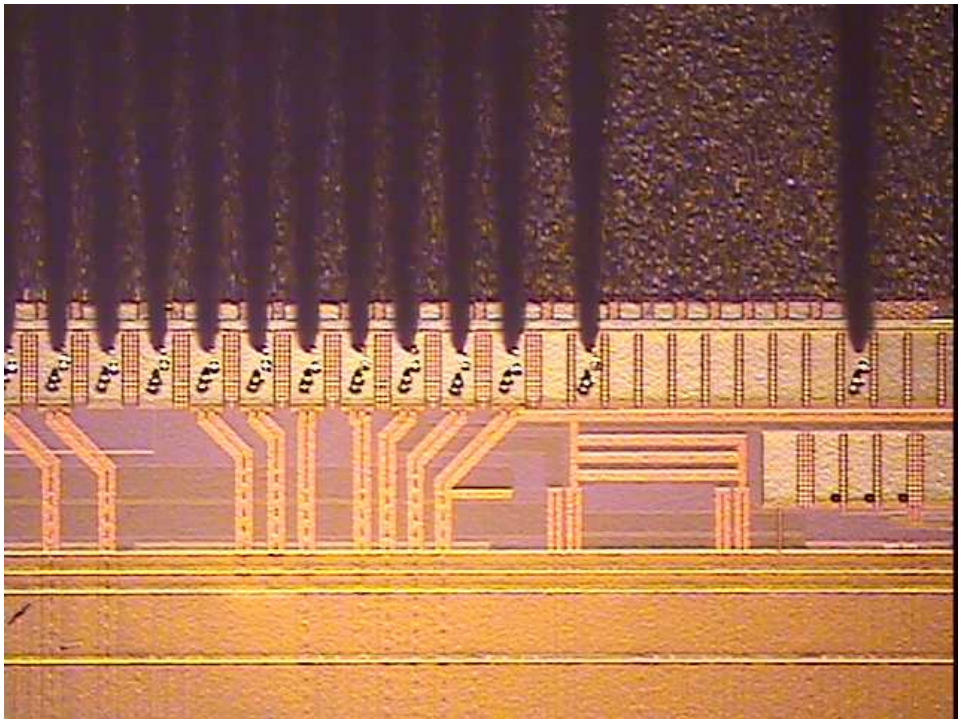
- **Die probing tests with Red FE-I4 Die #14 (Wafer V6ABC1H)**
- **When the die was powered up with usbpix & STcontrol the digital line drew 24mA while the analogue line drew 205mA (chuck height 4900μm).**



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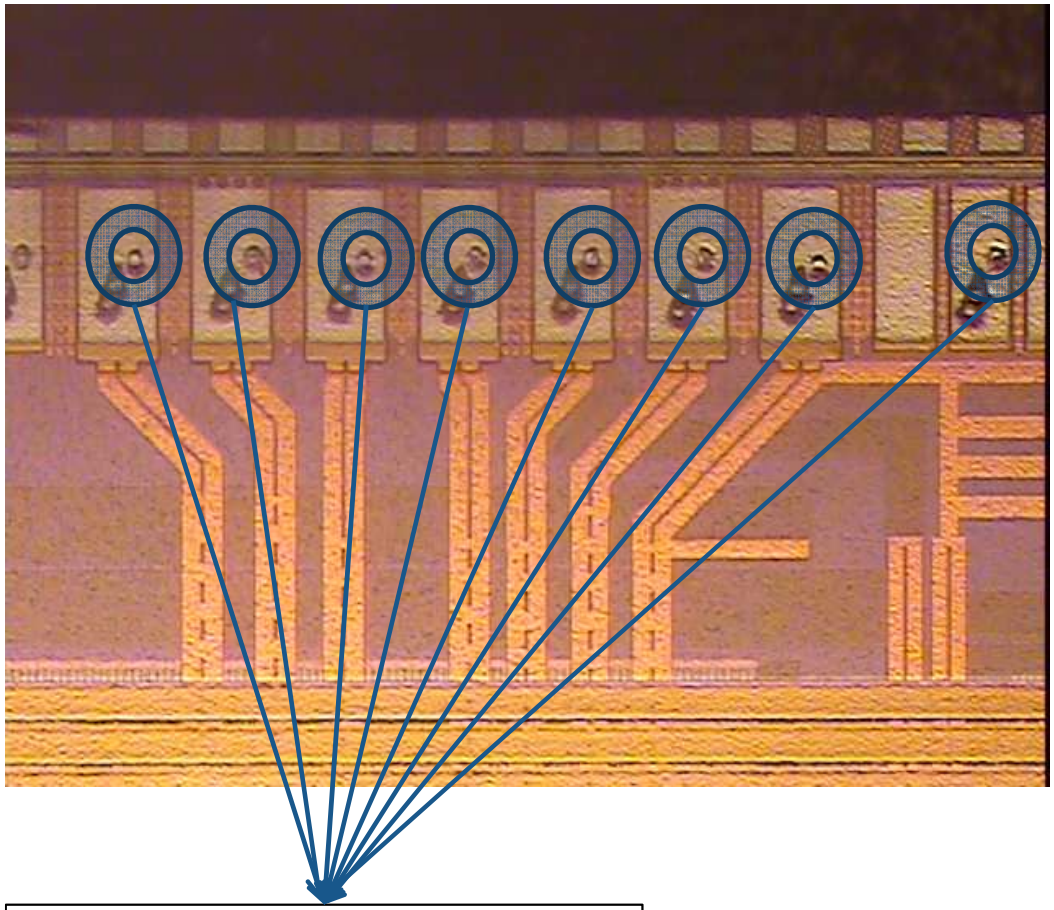
- **Probe marks – overdrive approximately 150-200μm.**
- **Probe marks consistent across die – good alignment between die and probe card/probe needles.**



Probe marks Glasgow 10 May 2012

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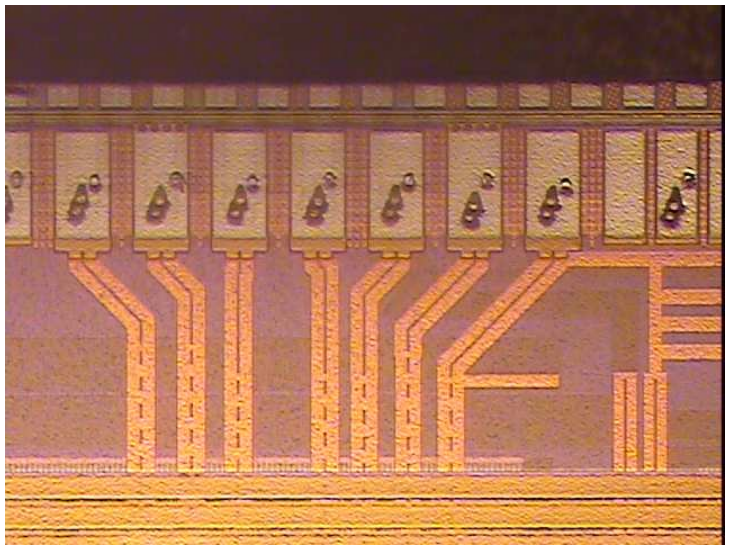
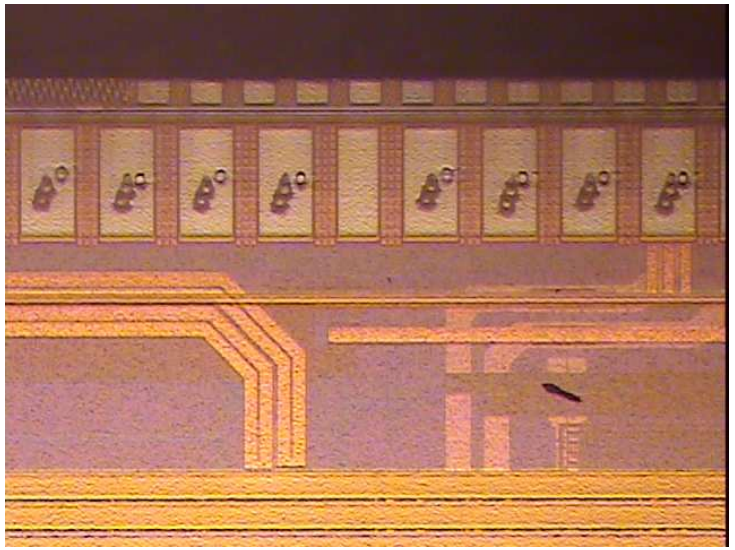
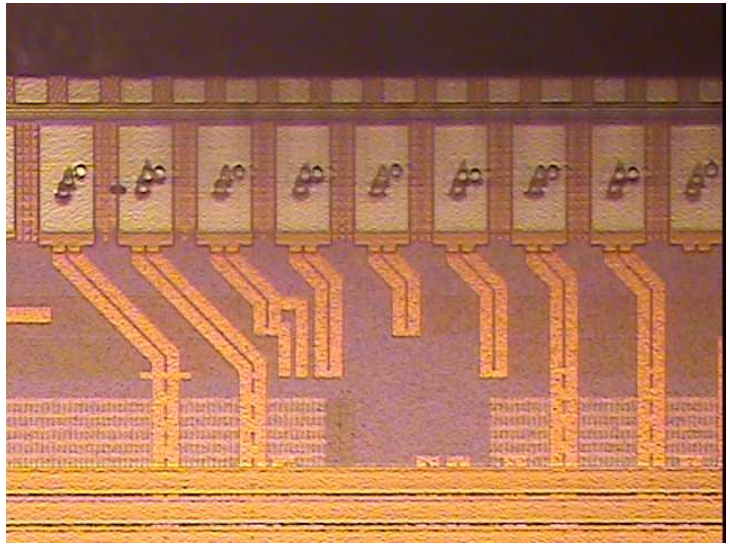




- Probe marks consistent across die.
- Good planarity between probe needles and die across chip.



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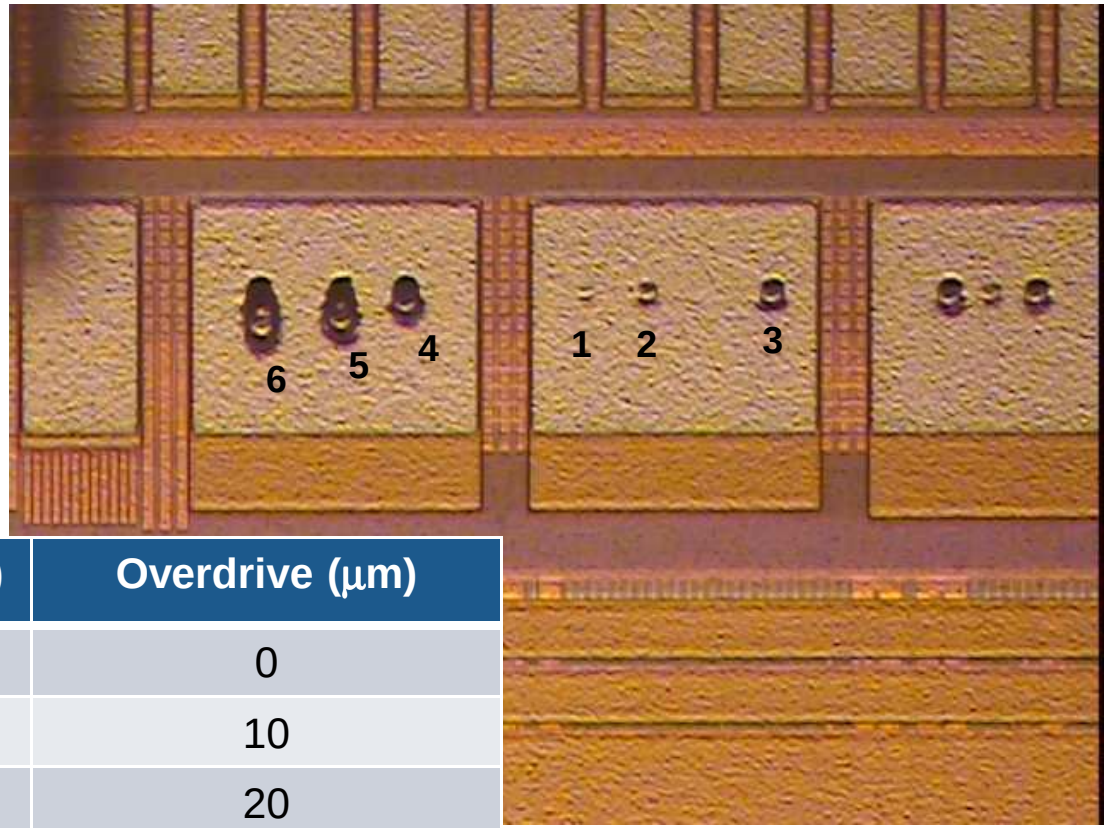
- The picture opposite shows the height gauge needle probe marks as a function of overdrive.
- Jumper added to probe card to power LEDs.
- At a predefined overdrive the height gauge needles should complete a circuit on the probe card and an LED should turn on.
- Right LED turns on after initial contact (chuck height ~4850µm).
- Left LED turns on at chuck height of 4870µm or ~20µm overdrive.
- Right LED remains ON for about 10-15 mins after needles retracted then turns OFF.



Probe Mark	Chuck Position (µm)	Overdrive (µm)
1	4850	0
2	4860	10
3	4870	20
4	4900	50
5	4950	100
6	4970	120

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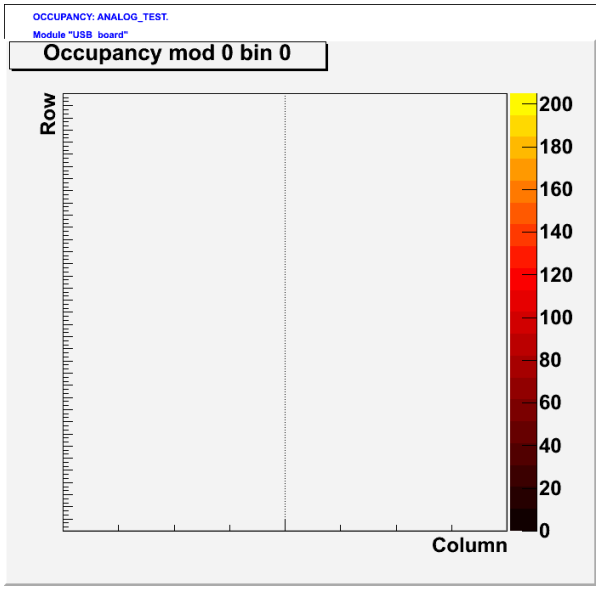
- **Yellow chip 43 from wafer V6ABC1H**

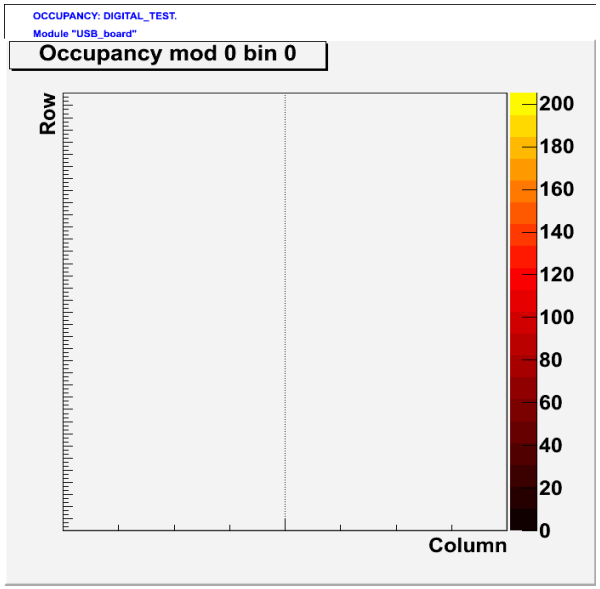
– Comments from first wafer probing test at Bonn

– High V_{DDA2} after power up (350mA); high threshold: 11,500e. In re-run high current not seen, but columns 79/80 do not work.

– Wafer Probing at Glasgow

- Power supply currents. Digital supply was **26mA**. Analogue supply was **56mA**.
- Rx Delay Scan give error: **USBPixController exception. Type: Delay scan could not find a reasonable delay value for board ID -1.**
- Analogue and Digital scans gave empty plots???





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- Without using STControl is there anyway of knowing if all the probes have made good electrical connections with the chip?
- What current should the analogue and digital lines draw – is this a good indication that the chip has powered up correctly?
- Which software package should we be using for FE-I4A – USBPix or STControl?
- Does the Primlist need to be changed for wafer probing?
- How to conduct I_{Ref} and I_{cap} current measurements with Keithley 2410?
- How to conduct Voltage measurements V_{Ref}Out Digital, V_{Ref}Out Analogue, Band gap V_{Ref} Digital, Band gap V_{Ref} Analogue, PlsrDAC?
- Noise coupling to I_{ref} – need 4-channel switch?